

1. 1 Fill in the blanks.

The geometric series $\sum cr^n$ converges if $|r| < 1$ and diverges if $|r| \geq 1$.

2. 9 Please indicate **T** or **F** false.

- (a) T / **F** : The telescoping series

$$\left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{4} - \frac{1}{5}\right) + \left(\frac{1}{5} - \frac{1}{6}\right) + \dots$$

converges to 1.

- (b) **T** / F : The telescoping series

$$(1 - 2) + (2 - 3) + (3 - 4) + (4 - 5) + (5 - 6) + \dots$$

converges to 1.

- (c) **T** / F : The geometric series

$$1 + \frac{5}{2} + \frac{25}{4} + \frac{125}{8} + \frac{625}{16} + \dots$$

converges to $\frac{1}{1 - \frac{5}{2}}$.

- (d) T / **F** : The geometric series

$$1 - \frac{2}{5} + \frac{4}{25} - \frac{8}{125} + \frac{16}{625} - \dots$$

converges to $\frac{1}{1 + \frac{2}{5}}$.

- (e) T / **F** : If $a_n \rightarrow 0$ as $n \rightarrow \infty$, the sequence $\{a_n\}$ converges.

- (f) **T** / F : If $a_n \rightarrow 0$ as $n \rightarrow \infty$, the series $\sum a_n$ converges.

- (g) T / **F** : If $a_n \rightarrow 2$ as $n \rightarrow \infty$, the sequence $\{a_n\}$ converges.

- (h) **T** / F : If $a_n \rightarrow 2$ as $n \rightarrow \infty$, the series $\sum a_n$ converges.

- (i) **T** / F : The Harmonic series

$$\sum_{n=1}^{\infty} \frac{1}{n} = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \dots$$

converges.